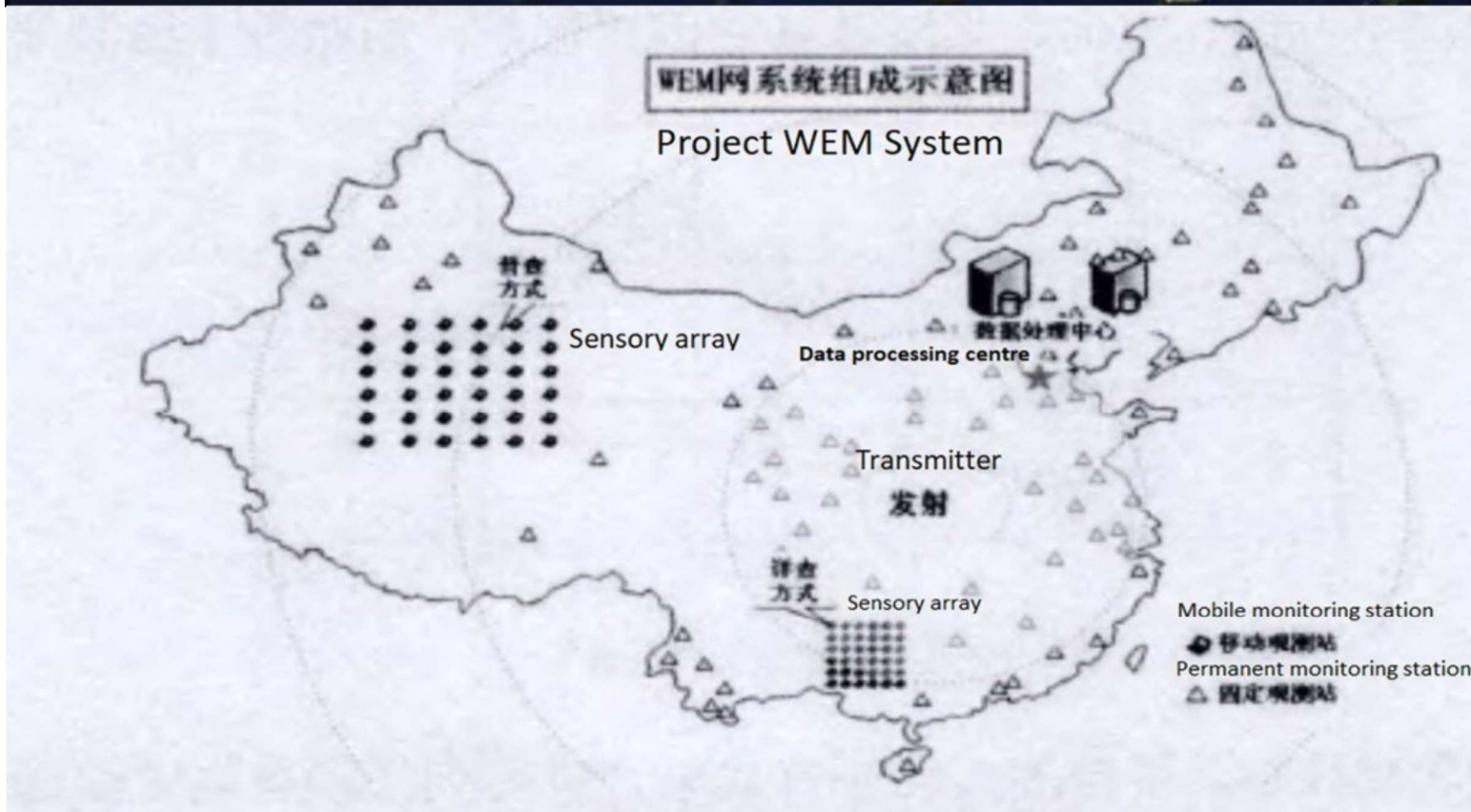


San Diego DX Club Bulletin

July 2019



JULY PROGRAM

1948 GATTI HALLICRAFTERS DXPEDITION TO AFRICA

MEETING NOTICE:

WEDNESDAY, JULY 24, 2019

JOIN US AT THE SIZZLER, 3755 Murphy Canyon Road,

San Diego, CA 92123 (858) 278-6988

SOCIAL HOUR, 5:00 P.M. DINNER, 5:30 P.M.

MEETING, 6:30 P.M

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From the Prez . . .

Ron, N6XT

This is my first letter, I thank the membership for voting me in.

Just a quick reminder the DX Bash is at Randy and Dawn Stanke's house.

Thank the Stankes for Hosting this years Bash.

When possible please car pool as there is limited parking. A successful Bash require members to help where needed. Contact Pat (WA6MHZ) let him know where you can help.

We still need more people to sign up to help out with the Bash.

Not too much for me to report on DX. I hopefully will have my station up and running by August. Pat has sent out a notice of the program for this month.

Bob has recovered enough to start doing the Bulletin. Welcome back Bob.

Glad to aboard.

Best DX

Ron, N6XT



Secretary/Treasurer Reports

Randy, KQ6RS

Meeting Minutes, June 26, 2019

At 6:30 pm Ron Richards, WB1EAZ, called the meeting to order. 30 members and three guests were in attendance. Our guests were Jerry Schneider KN6CGB, Chris Claborne N1CLC, and Don Theriault N6PTF.



It was announced that Harry Hodges, W6YOO, had passed away this week. We had a moment of silence. Mike Binder, NA6MB, read a brief biography of Harry and many members shared their stories about Harry.

The May Treasurer report and meeting minutes were approved.

The new board was voted on and approved. The positions are: President Ron Rosson, N6XT; Vice President Pat Bunsold, WA6MHZ; Secretary/Treasurer Randy Standke, KQ6RS; Board of Directors are Bob LaRose, W6ACU and Eric Gruff, NC6K and Lou Poanessa, KW6Q. The Past President is Ron Richards, WB1EAZ.

Announcements: The bash will be held on Sunday August 4th, at the QTH of Randy Standke, KQ6RS, located in Rancho Penasquitos.

Old business – None. New business – None.

At 6:58 pm we started the round table discussion.

At 7:43 We played a video about the BS7H DXpedition to Scarborough Reef.

At 8:45 pm the meeting was adjourned.

Treasurer's Report

Income for June:	\$25.00 from membership dues
Expenses for July:	\$155.88 for inventory of six shirts (which will be paid back as members buy them)
Statement Balance on 6/29/2019	\$7,718.66

Randy, KQ6RS

THE SDDXC TOP 10

By John, K6AM



TOTAL COUNTRIES WORKED ON DIGITAL

8/19	8/18	CALL		ZNS	C-D	CFM	WKD	CHG
1.	1.	K0XB		40	324	329	329	-
2.	2.	NN6K		40	324	325	326	-
3.	3.	N7CW		39	265	266	311	-
4.	4.	K6XT		40	296	296	299	-9
5.	5.	NA6L		32	263	263	269	-
6.	6.	WB6BFG	40	253	254	266	-	
7.	8.	WN6K		40	212	213	247	-
8.	10.	K5OA		30	212	216	239	+35
9.	-	W6HDG	39	205	205	221	NEW	
10.	9	K6ZH		39	191	191	219	-

The big news is the 35 point jump by K5OA moving him up two places. There are plenty of new ones out there for the rest of us, so give the digital modes a try. Digital is becoming more popular all the time. The advent of FT8 has really ignited a surge of interest. The old 60 WPM baudot RTTY mode is now heard mostly only on contest weekends.

New software from Joe Taylor is being introduced all the time. MMTTY is a good one for RTTY contesting with Wintest or N1MM and a sound blaster card, but now I'm hearing good things about a new decoder called "2Tone". Most of the expeditions are now doing a fair amount of RTTY and FT8 for The Deserving. We'll be looking for many more entries next year in this fun but under-represented category.

Each month, we will publish a top ten list for one of the lesser recognized but hard won categories. Coming up next, phone and CW. Please send me your totals for each band and mode throughout the year and you will be listed in coming months. Use the convenient form at <http://www.sddxc.org> or bring 'em to the meeting.

John, K6AM

**THE SDDXC CONTEST RESULTS****By John, K6AM****ARRL SWEEPSTAKES CW CONTEST**

CLASS	CALL	SCORE	QSO'S	MLTS	FINISH
SO - U	N5ZO	190,568	1,148	83	#2 SW DIV
MS - HP	NX6T (N6KI WQ6X)	143,258	863	83	#2 SW DIV
SO - LP	WN6K	91,938	597	77	#2 SW DIV
SO-U	NC6K	87,516	561	78	#7 SW DIV
SO - Q	N7CW	75,360	471	80	#2 SW DIV
SO - HP	K6NA	13,108	113	58	

ARRL SWEEPSTAKES PHONE CONTEST

CLASS	CALL	SCORE	QSO'S	MLTS	FINISH
MS - HP	K6AM + KI6RRN KK6NON N6KI N6MJ N6WIN	323,036	1,946	83	#1 US/VE
SO - LP	WN6K	86,832	536	81	#2 SW DIV
SO - LP	KI6RRN	46,656	324	72	#3 SW DIV
SO - HP	W6JBR	15,162	133	57	
SO - LP	W6ZAR	6,300	70	45	

**2018 CQ WORLDWIDE PHONE DX CONTEST**

CLASS	CALL	SCORE	QSO'S	MLTS	FINISH
SO – HP	K6NA	2,121,929	1,668	463	# 2 W6, #3 ZONE 3
SO – LP	RM3F (N5ZO)	1,262,240	2,263	392	# 1 UA3, # 15 WORLD
SO - LP	KI6RRN	860,096	916	356	# 1 ZONE 3, #3 USA
SA – HP	N6CW	556,784	584	368	# 9 W6
SO - HP 20M	W6YA	384,964	899	157	# 1 ZONE 3, #4 USA
SA – HP	N6NC@N5ZO	252,000	403	240	# 19 W6
SA - LP	WN6K	192,807	386	193	# 2 W6, # 5 ZONE 3
SA – HP	K5OA	118,096	293	176	
SA – HP	N6KI	88,872	200	168	
SA – HP	W6JBR	32,967	128	99	
M2	NX6T (N6KI WM6Y)	23,970	139	85	

2018 CQ WORLDWIDE CW DX CONTEST

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SO – HP	K6NA	2,121,929	1,668	463	# 2 W6, #3 ZONE 3
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From the Editor

Bob, K9RHY



Just a Note and a BIG Antenna

First, it's great to be back.

After a lengthy period of recovery (January till now), I'm truly delighted to be able to resume my SDDXC Bulletin Editor role. Without taking up too much space, I'll share a short summary of my experience with my friends and fellow DXers at the SDDXC.

First, a big "THANK YOU" for the get well cards and all the good wishes from my fellow members. The many boosts I received were much appreciated and a major lift to my spirits when I really needed them.

Here is the story. On a Sunday afternoon in mid-January, I started feeling unwell. It got worse. I finally asked my wife to help me get some help. I told her an ambulance ride to the emergency room would be best.

I had experienced a rare event: a rupture in the lining between my esophagus and stomach. My primary care doctor later told me he hadn't seen this condition in over 15 years of practice. He also told me that if I was a cat with nine lives, I would have used up two of them. This event put me in intensive care for 8 days followed by several weeks of recovery in the hospital. My next stage was in rehabilitation. I couldn't walk. I couldn't even put my legs over the side of the bed. Rehab took me to a specialized hospital where I received a massive blood transfusion (apparently, I was down by almost 2/3). The transfusion fixed much of the walking problem.

I next spent time in a specialized rehabilitation facility where my walking and balance were restored. I came home but had to return to the hospital for more treatment. The home health folks then took over.

To make this long story as short as possible, I got a bit better every day and am now back at about 90% of where I was when this all started.

Thank you, doctors!

Now for this month's narrative. I had prepared this for the January 2019 edition of the SDDXC Bulletin, but since that never happened, I'll share it now.

A BIG Antenna

Submarines operating deep underwater are virtually cut off from the outer world but remain a vital component of our defense infrastructure. Communications with these ships must be maintained to enable receiving “orders from headquarters” while remaining submerged. Conventional radio communications do not fit the bill as higher frequencies get attenuated very sharply in sea water. At VLF frequencies, which are presently being used by most of the world Navies, signals can penetrate only up to 8 - 10 meters of depth. This depth is not enough in a hostile (combat) environment.

Very Low Frequency VLF (3–30 kHz) can penetrate seawater to a depth of approximately 20 meters. VLF data transmission rates are around 300 bit/s – or about 35 eight-bit ASCII characters per second (or the equivalent of a sentence every two seconds) – a total of 450 words per minute. Simply shifting to 7-bit ASCII increases the number of transmitted characters per time unit by 14%. An additional shift to a 6-bit or a 5-bit code (such as the Baudot code) results in speeds of more than 600 and 700 words per minute.

Low frequency communications are generally at 10kHz or lower. The penetration depth in seawater is only a few meters, and a very long antenna wire is required to float near the surface.

Only a few countries operate VLF facilities for communicating with their submarines: The United States, Russia, United Kingdom, Germany, Australia, Pakistan, and India.

Electromagnetic waves in the Extremely Low Frequency (ELF) and Super Low Frequency (SLF frequency ranges (3–300 Hz) can penetrate seawater to depths of hundreds of meters, allowing signals to be sent to submarines at their operating depths. Building an ELF transmitter is, however, quite a challenge, as they must work at incredibly long wavelengths: The Seafarer system operated at 76 Hz, the Soviet/Russian system (called ZEVS) at 82 Hz. The latter corresponds to a wavelength of 3,656.0 kilometres. That is more than a quarter of the Earth's diameter. A simple half-wavelength dipole would require a lot of wire and a lot of real estate.

Due to the technical difficulty of constructing an ELF transmitter, the US, Russia and India were the only nations known to have constructed ELF communication facilities. Until it was dismantled in late September 2004, the American *Seafarer*, later called *Project ELF* system (76 Hz), consisted of two antennas, located (since 1977) at Clam Lake, WI and at Republic, MI, in the Upper Peninsula (since 1980). The Russian antenna (*ZEVS*, 82 Hz) is installed at the Kola Peninsula near Murmansk. It was noticed in the West in the early 1990s. The Indian Navy has an operational VLF communication facility at the INS Kattabomman naval base to communicate with its Arihant class and Akula class submarines.

If you wanted to build an ELF antenna you'd need an area with very *low* ground conductivity then bury two huge electrodes in the ground at different sites, and then feed lines to them from a station in the middle, in the form of wires on poles.



For example, the distance used by the ZEVS transmitter located near Murmansk is 60 kilometers (37 miles). As the ground conductivity is poor, the current between the electrodes will penetrate deep into the Earth, essentially using a large part of the globe as an antenna. The U.S. ELF antenna length in Republic, Michigan, was approximately 52 kilometers (32 mi). The antenna is very inefficient. To drive it, a dedicated high-power transmitter is required, although the power emitted as radiation is only a few watts. Its transmission can be received virtually anywhere. A station in Antarctica at 78° S 167° W detected transmission when the Soviet Navy put their ZEVS antenna into operation.

Extremely Low Frequency (ELF) radio has wavelengths that are tens of thousands of miles in length, allowing them to penetrate geographic obstacles such as mountain ranges and ocean water. Their main utility is military, as submarines can receive ELF signals without the need to surface and potentially reveal their positions.

ELF radio antennas are huge, measuring dozens of miles. They can only send a few characters a minute, and whatever is sent is a one-way message, since submarines cannot mount the equipment needed to send their own ELF waves.

Wireless Electromagnetic Method is an emerging technology well suited to communicating with submerged submarines. The technology is also employed for earthquake warning systems as well as in wireless power transmission. China is using WEM as the technology they have selected for submerged ship communication.



China has built a giant experimental radio antenna on a piece of land almost five times the size of New York City, according to researchers involved in the project.

China's Wireless Electromagnetic Method (WEM) project took 13 years to build.

Upon completion, a Chinese nuclear submarine successfully communicated with the station from deep water – making China the third country in the world to have established such a submarine communication system.

But the Chinese navy is eager to expand its capacity and has been pouring resources into the more advanced ELF radio technology, which allows submarines to communicate with the command center from a greater depth and is harder to disrupt.

The Chinese government, however, has played down the importance of the facility, which occupies some 3,700 square km (1,400 square miles) of land, in information released to the public.

Apart from the need to protect an important strategic asset, some researchers said the secrecy was to avoid causing public alarm.

The antenna would emit ELF signals with a frequency of between 0.1 to 300 hertz, the researchers said.

The exact site of the facility has not been disclosed, but information available in Chinese research journals suggests it is in the Huazhong region, an area in central China that includes Hubei, Henan and Hunan provinces.

Project WEM's main surface structure is a pair of high voltage power supply lines stretching from north to south, east to west on steel lattice towers, which form a cross that is 60km (37 miles) wide and 80km to 100km long.

At the end of each power line, thick copper wire goes underground through a deep borehole. Two power stations generate strong currents and electrify the ground in slow, repeating pulses, turning the earth underfoot into an active source of electromagnetic radiation.

The radio pulses not only pass through the atmosphere, but travel through the Earth's crust as well, with a range of up to 3,500km, according to the project scientists.

A sensitive receiver within that range, which is roughly the distance between China and Singapore or Guam, would be able to pick up these signals.

The closer to the power source, the stronger the pulses.

The radar will be difficult for spy satellites to detect because it will appear no different to an ordinary power grid, although a radar expert said it might be possible to detect its emissions and use those to determine the location.

The inland location of the new facility would also make it harder for an enemy to attack compared with a facility located on the coast.

But to me, the question remains about how the U.S. Navy communicates with submerged submarines today. That information appears to be highly classified and unavailable to DXers, but since the U.S. Navy's ELF system shut down several years ago, there must be a new communications mechanism. My speculation is that it is entirely satellite based.